

Original article

Business responsibility regarding climate change in Latin America: An empirical analysis from Clean Development Mechanism (CDM) project developers

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ABSTRACT

From a business perspective, climate change mitigation offers certain opportunities that drive the market for new business, and presents an opportunity to engage in Corporate Social Responsibility (CSR). In this study, we examine the motivation for companies in Latin America to implement Clean Development Mechanism (CDM) projects, whether CDM encourages the adoption of CSR practices, and the benefits companies gain from adopting such practices. The data are taken from a survey of project developer companies in Brazil, Mexico and Peru. The results show that government influence and/or incentives have been very low. The benefits of participating in such projects include being viewed as industry leaders in the country and improving corporate reputation.

1. Introduction

Since climate change was first identified as an international political issue at the United Nations Conference on Environment and Development, 1992, policies have evolved to address global environmental problems (Lazaro and Gremaud, 2017; Munasinghe and Swart, 2005). The Kyoto Protocol, which was adopted in 1997 during the Third Conference of the Parties (COP 3) in Kyoto, Japan, came into force in February 2005; its first commitment period was 2008 to 2012. At the end of 2012, during COP 18 in Doha, Qatar, the “Doha Amendment to the Kyoto Protocol” was adopted, memorializing agreement on a second commitment period, from January 2013 to December 2020 (UNFCCC, 2017a). A new post-2020 agreement, the so-called “Paris Agreement,” was reached in 2015, during the COP 21 in Paris, France. It entered into force on November 4, 2016.

The need to mitigate climate change by simultaneously achieving emissions reductions and economic growth poses challenges to businesses and governments (Okereke et al., 2012). This fueled the establishment of the market-based mechanism as a possible solution, which has often been portrayed, politically, as a success story (Calel, 2013). In particular, the Kyoto Protocol's Clean Development Mechanism (CDM) was established with dual objectives: to help industrialized countries meet their greenhouse gas (GHG) reduction commitments and to

promote sustainable development by implementing emissions reduction projects in developing countries.

Growing public awareness of climate change is founded on the belief that actions and policies should focus on achieving sustainable development (Benites-Lazaro et al., 2017; Benites-Lazaro and Mello-Théry, 2017). As a result, climate change has been embraced as a matter of Corporate Social Responsibility (CSR) (Newell and Paterson, 2010) and as a central business response to the need to promote sustainable development (Benites and Polo, 2013; Hahn, 2011) through CSR activities (Benites-Lazaro et al., 2017; Benites-Lazaro and Mello-Théry, 2017).

Many researchers have identified companies in the resource extraction sector as being at the forefront of CSR (Hilson, 2012; Ranängen and Zobel, 2014; Slack, 2012). Many of these studies advocate that investment in this sector can play a key role in reducing poverty and that the economic benefits of doing so typically outweigh any negative social or environmental aspects (Sagebien et al., 2008). However, in practice, CSR initiatives in this sector are often criticized as being philanthropic gestures, rather than carefully thought-out sustainable projects; many view them as more of a “burden than a blessing” (Emeseh, 2009; Ranängen and Zobel, 2014).

In Latin America, CSR is often seen as a “magical realism” because companies' commitments in this area can be very difficult to believe,

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and therefore fall between reality and fantasy (Benites-Lazaro et al., 2017; Benites-Lazaro and Mello-Théry, 2017; Klein, 2013). Throughout the region, there have been numerous corporate scandals linked to human rights violations, environmental contamination, corruption, and violation of government regulation. Furthermore, studies indicate that, with the exception of a small number of companies in Latin America, CSR is presented at a discursive level, without massive implementation or transformation of business management (Lázaro and Gremaud, 2016; Peinado-Vara, 2006).

Latin America provides an ideal setting to explore how business is responding to climate change; the economic activity of the region relies heavily on resource extraction and consumes high levels of energy. This dependence has led to greater specialization in the export of primary commodities, which has resulted in increased carbon emissions, deforestation, biodiversity loss, land use changes, and the degradation of ecosystem services (De la Torre et al., 2016; Fehlenberg et al., 2017; Gruss, 2014).

Under the Kyoto Protocol, Latin American countries did not have binding targets to reduce GHG emissions. However, this situation changed following implementation of the Paris Agreement, which was ratified by almost all represented countries, forcing them to present their national targets through their Nationally Determined Contributions (NDCs), which demonstrate their intent to contribute to reducing GHG emissions.

In particular, Article 6 of the Paris Agreement establishes mechanisms that contribute to the mitigation of GHG emissions and support sustainable development (UNFCCC, 2015). Thus, lessons learned from the CDM and business responses are important for future climate commitment. The business sector has been recognized as a major player in addressing climate change; its actions have been essential in shaping effective policy responses and appropriate mitigation measures to avoid GHG emissions (Halkos and Skouloudis, 2016; Jones and Levy, 2007).

This study examines the motivation for companies in Latin America to implement CDM projects, whether CDM projects encourage the adoption of CSR practices and highlights the benefits gained by companies which have adopted such activities. For this purpose, a questionnaire survey was administered at companies that develop CDM projects in Brazil, Mexico, and Peru. Brazil leads the carbon market in the region, followed by Mexico. Peru was chosen because it is one of the countries that has established institutions with relatively simple procedures in place for implementing CDM projects.

The remainder of this paper proceeds as follows. Section 2 presents a review of the literature on business responses to climate change as part of CSR and on CSR in Latin America. Section 3 describes the data and methods used in this study. In Section 4 we present the results. Section 5 discusses the results, and Section 5 presents concluding remarks.

2. Literature review

2.1. CSR and climate change

In the early 1990s, a proactive business response to climate change was quite unusual (Pinkse and Kolk, 2009). However, since the adoption of the Kyoto Protocol (Kolk and Pinkse, 2004), there has been a change from skepticism and a lack of attention to a significant number of initiatives in favor of the environment and climate change specifically. In addition, there have been stronger institutional pressures and increasing regulation, mainly from developed countries, a case in point being work carried out through the European Climate Change Program (Cadez and Czerny, 2016; Ihlen, 2009; Pinkse and Kolk, 2009).

One dimension of CSR is the issue of climate change and the responsibility of companies to address it by reducing GHG emissions (Moon and Vogel, 2008). In business discourse, climate change is presented as an opportunity for profit, rather than as a threat (Benites-Lazaro et al., 2017). This opportunity emerged primarily as a result of

the Kyoto Protocol (Kolk and Pinkse, 2004), which introduced three market-based mechanisms (CDM, joint implementation, and emissions trading), thereby creating the so-called “carbon market”. In particular, CDM projects were considered more as an incentive structure and less as a coercive set of rules to encourage a different group of actors to make an effort toward addressing the dual stipulated objectives of promoting sustainable development and reducing GHG emissions (Martinez and Bowen, 2013).

There are several examples of initiatives and programs being adopted by companies in response to climate change that show how important the issue is for such companies and what their essential role is in formulating strategies capable of accommodating the business risks and opportunities posed by climate change (Amran et al., 2016; Pulver and Benney, 2013). Such risks can be physical, regulatory, market-related or reputation-related (Hoffman, 2005; KPMG, 2008). Business opportunities include revenue generation and the creation of new markets to profit from carbon offset trading and investing in clean technology; anticipating and influencing climate change regulations; improving the company's reputation; and serving as a tool for CSR (Bulkeley and Newell, 2015; Newell and Paterson, 2010; Pulver and Benney, 2013; Vogel, 2008).

Several studies have sought to explain the motivations for companies to implement climate change mitigation activities. From an economic point of view, economists have attempted to place the analysis of climate change mitigation in the context of cost-benefit analyses (Nordhaus, 2007; Stern, 2007). Here, external costs are internalized in an effort to create a competitive advantage through various policy instruments, resulting in a price that also reflects environmental impacts (Cerin and Karlson, 2002). This is a win-win situation; it not only protects the environment, but it also increases the profits and competitiveness of companies through improved products or production processes (Porter and van der Linda, 1995; Savitz and Weber, 2006; Stefan and Paul, 2008).

From a political economy perspective, climate change is presented both as a global crisis that threatens to disrupt economic progress and as an opportunity to stimulate the dominant mode of capitalist development (Bumpus and Liverman, 2008; Clapp and Dauvergne, 2005; Levy and Egan, 2003; Newell and Paterson, 2010). In the latter case, capital is transformed from specific instances of environmental degradation into opportunities for profit. These opportunities are based on financial compensation for investments aimed at reducing GHG emissions, positioning companies at the forefront of solving global environmental problems, contributing to the mitigation of climate change, improving sustainable development within society, and saving companies money (Bulkeley and Newell, 2015; Levy and Spicer, 2013).

From the perspective of critical social theory, companies' climate change mitigation activities comprise a means of avoiding social pressures, marginalizing radical activists, reducing the threat of regulation, and positioning the companies as moral agent (Jones and Levy, 2007; Levy and Kaplan, 2008; Levy and Kolk, 2002). As such, CSR is seen as a discursive answer that seeks a “social license to operate” or “social legitimacy” by taking into account the demands and expectations of businesses that emerge from their stakeholders (Panwar et al., 2014; Scherer et al., 2013; Suchman, 1995).

Over the past decade, governments and companies have implemented policies and measures in a bid to reduce GHG emissions. In particular, some businesses have voluntarily engaged in initiatives such as emissions trading, setting GHG emission-reduction targets, adopting self-regulatory practices, and developing new technology and product innovations (Amran et al., 2016; Jones and Phillips, 2016). However, studies show that business responses to climate change are still in the early stages, and relatively few companies have been able to integrate the issue of climate change fully into their business strategies (Amran et al., 2016; Jones and Levy, 2007; KPMG, 2008; McKinsey, 2008).

2.2. CSR and business responses to climate change in latin america

In Latin America, the concept of CSR takes into account the three dimensions of sustainability (economic, environmental, and social) currently reflected in the definitions of the organizations that promote these issues. For example, the Mexican Center for Philanthropy (CEMEFI) defines CSR as follows:

...the conscious and congruent commitment to comply fully with its purpose, both internally and externally, considering the economic, social, and environmental expectations of all its participants, demonstrating respect for people, ethical values, the community and the environment, thus contributing to the construction of the common good. (Crespo, 2010, p. 125)

The *Forum Empresa* defines CSR as a new way of doing business, in which companies manage their operations in a more responsible and sustainable manner in relation to economic, social, and environmental issues (Forum Empresa, 2017). Similarly, the Brazilian Ethos Institute defines CSR as:

...the form of management that is defined by ethical, transparent and supportive relation of the company with all the audiences with which it relates and the establishment of business goals compatible with the sustainable development of society, preserving environmental and cultural resources for future generations, respecting diversity and promoting the reduction of social inequalities. (Instituto Ethos, 2006, p. 8)

In Latin America, CSR organization agree on the need to promote good business practices for society, and for businesses to take responsibility for the social, environmental, and economic impacts of their activities (Lázaro and Gremaud, 2016; Peinado-Vara, 2006). Here, CSR has “settled” as a concept, which has made it possible to observe the adoption and diffusion of practices and performance standards, such as sustainability reports based on the models of the Global Reporting Initiative (GRI), participation in the Carbon Disclosure Program (CDP), and adherence to global principles like the Global Compact.

For many large global companies, the CDP was the first program to publish GHG emissions records and the actions taken to mitigate such emissions. Today, the CDP, formerly the Carbon Disclosure Project, runs the global disclosure system that facilitates companies, cities, states, and regions in measuring and managing their environmental impacts (CDP, 2017). In Latin America, the CDP was first applied in Brazil in 2006; by 2008, it had expanded using a list of regions. “The Latin America 50” includes Argentina, Brazil, Chile, Mexico, and Peru (CDP, 2016).

In Latin America, there is a trend toward increased disclosure regarding sustainability reporting. For example, in 2000, only one report was presented by a Brazilian company, Natura (Benites-Lazaro et al., 2017; Benites-Lazaro and Mello-Théry, 2017); however, in 2016, Brazil presented 266 sustainability reports, followed by Colombia with 205, and Mexico with 116 (Fig. 1). Furthermore, Latin American companies have engaged in the Global Compact program, which the United Nations has run since its inception in 2000 and is considered an institutional reference for promoting CSR. The Ten Principles of the Global Compact promote universal values, such as environmental sustainability, human rights and justice. According to survey data on the number of companies that adhered to the Global Compact through December 2017, Brazil had 234 companies, followed by Colombia with 163 and Mexico with 162 (see Fig. 1).

As Lázaro and Gremaud (2016) explain, in Latin America, CSR is in the emerging and consolidation stage. Here, there are societal concerns about environmental problems; an emerging body of research on CSR that is focused on the reality of each country; and the presence of private entities, such as the Ethos Institute in Brazil, the Mexican Center for Philanthropy – CEMEFI in Mexico, ACCIÓN RSE in Chile and IARSE in Argentina, that exist to promote CSR. In addition, several countries in

the region have joined global organizations, such as the World Business Council for Sustainable Development and Business for Social Responsibility, which support sustainable business practices.

Furthermore, the two largest Latin American economies, Brazil and Mexico have implemented business initiatives to reduce GHG emissions. In Brazil, these include the Brazilian GHG Protocol Program, the Carbon Efficient Index (ICO2), and the Corporate Sustainability Index (ISE). Mexico has implemented the Mexico GHG Program, a voluntary program of accounting for and documenting GHG emissions, which has driven companies to adopt strategies for climate change. The program has developed GHG performance standards and identified climate change risks and opportunities related to companies that participate in the CDM or other carbon markets (Lázaro and Gremaud, 2016).

Despite some progress towards the dissemination of CSR practices and actions to respond to climate change, there are still frequent reports of companies in Latin America that are involved in misconduct. Communities are negatively impacted by such misconduct, which contaminates the environment, violates human rights and people's right to health, and damages the land of local and indigenous communities. This has led to public dismissal and doubt of CSR initiatives, with some people referring to interventions as “magical realism” (Benites-Lazaro et al., 2017; Benites-Lazaro and Mello-Théry, 2017), and has prompted accusations of “greenwashing” (see e.g. Panwar et al., 2014; Siano et al., 2017). Overall, the understanding of CSR as a strategy in Latin America is still new, with only a small number of companies having actually incorporated the three dimensions of sustainability into their operations (Lázaro and Gremaud, 2016; Vives, 2013).

3. Data and methods

The data for this study were collected in three stages. In the first stage, we collected data from the Project Document Design (PDD) which are available on the website for the United Nations Framework Convention on Climate Change (UNFCCC). As shown in Fig. 2, the CDM projects registered by Brazil as of December 2017 totaled 342, Mexico had 192 projects, and Peru had 61 projects. In 2006, Mexico registered 60 projects, which was the largest number the country had registered in a single year in the period 2005–2017. In 2012, the largest numbers of projects were registered by Brazil and Peru, with 100 and 30 projects, respectively. Since then, the registration of CDM projects has decreased. In 2014, only Brazil has registered, with 12 projects. In 2015, all three countries registered; Brazil registered four projects, Mexico two, and Peru one. In addition, the average price of the secondary Certified Emission Reductions (CERs) that had reached its highest level of around €23.10/tCO₂e during 2008 fell below €0.4/tCO₂e in 2017 (Quandl, 2017).

Fig. 3 shows projects by sectoral scope. The sector with the most CDM projects was the energy industries, followed by the waste handling and disposal sector and the agriculture sector. Brazil led in the energy industry with 214 projects, mainly for projects developed in hydroelectric, wind, and cogeneration plants through the use of biomass, related to the treatment of sugarcane bagasse. Mexico has the most CDM projects in the area of waste management, with 127 projects, and an especially large number of projects developed in pig farms and landfills. Peru has the most CDM activities in the energy sector, with 54 projects mainly related to hydroelectric plants.

The data taken from the PDD were from companies that develop CDM projects. The survey was sent to those responsible for the projects, as described in Annex 1 of PDD. Thus, the final sample for the questionnaire survey included 41 companies in Brazil, 13 companies in Mexico, and 20 companies in Peru (see Table 1).

For the purposes of this research, we considered CDM project developers to be the companies that own the sites and the plant operators where emission reduction projects are installed. These are the agents involved in developing CDM project activities. Consulting firms were not considered.

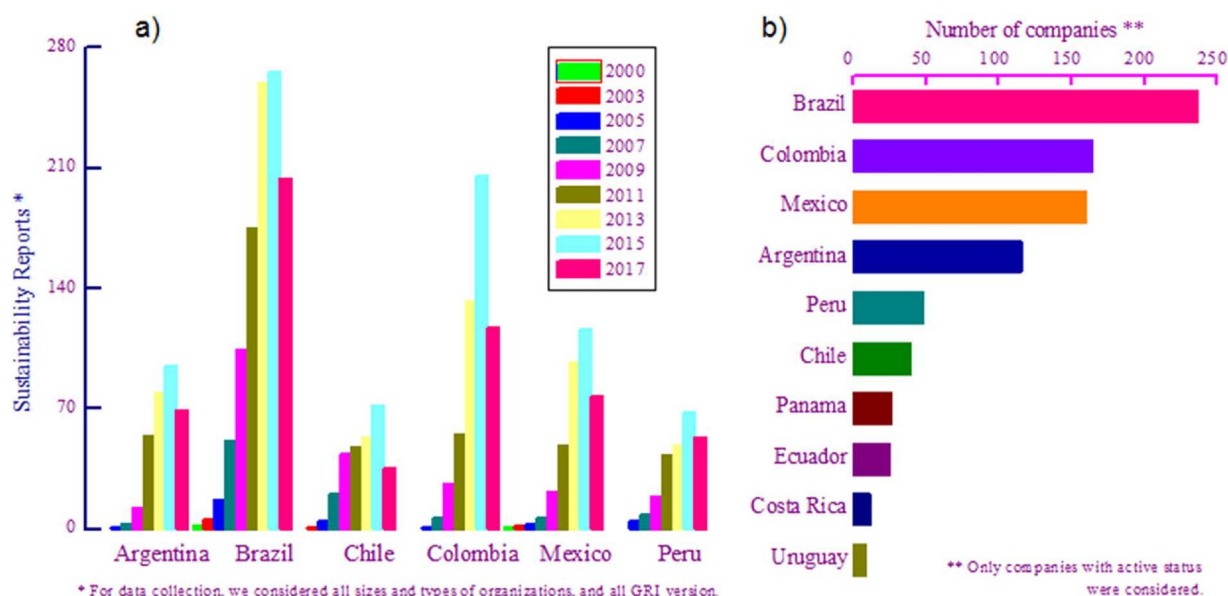


Fig. 1. Number of companies in Latin America participating in sustainability reporting disclosure (a) and Global Compact (b).
Sources: Global Compact (2017) and GRI (2017).

In the second stage, we developed the questionnaire using the Delphi technique. After designing a draft version of the questionnaire, and improving its structure and content, we submitted it to a panel of four leading Latin American experts on climate change and the carbon market from Brazil, Mexico, Peru, and Spain (Curtis, 2004; Kaynak and Macaulay, 1984; Linstone and Turoff, 1975).

In the third stage, after the validation process, the questionnaire was sent to a sample population of companies that had registered CDM projects. The questionnaires were sent via e-mail to the persons in charge of the projects, as reported in Annex 1 of the PDD. In an attempt to increase the response rate, respondents were then contacted by telephone to encourage their collaboration in the research.

The questionnaire comprises three themes: 1) the motivation to develop a CDM project; 2) the contribution of the project to the company in terms of sustainability; and 3) the improvement of the value, position, or image of the company due to its participation in the CDM project.

As shown in Table 1, we received valid responses from 26

companies in Brazil (63.4% response rate), 12 companies in Mexico (92%), and 14 companies in Peru (70%). Altogether, we obtained 52 responses, which provided a statistically acceptable sample with a confidence level of 90% and a sampling error of 10%.

The procedures and measures used to analyze the data were as follows:

- A Likert scale of five points, ranging from one (nothing) to five (much) to verify the level of agreement or disagreement with a proposition that expresses something favorable or unfavorable regarding to a variable.
- An exploratory analysis of the variables (frequency tables, measures of trend). Data were organized according to the occurrences of observed results and presented in frequency tables of responses to questions and relative values (as percentages) for ease of comparison.
- A test for independence using Pearson's chi-squared test (see Table 2) was used to determine whether there were significant

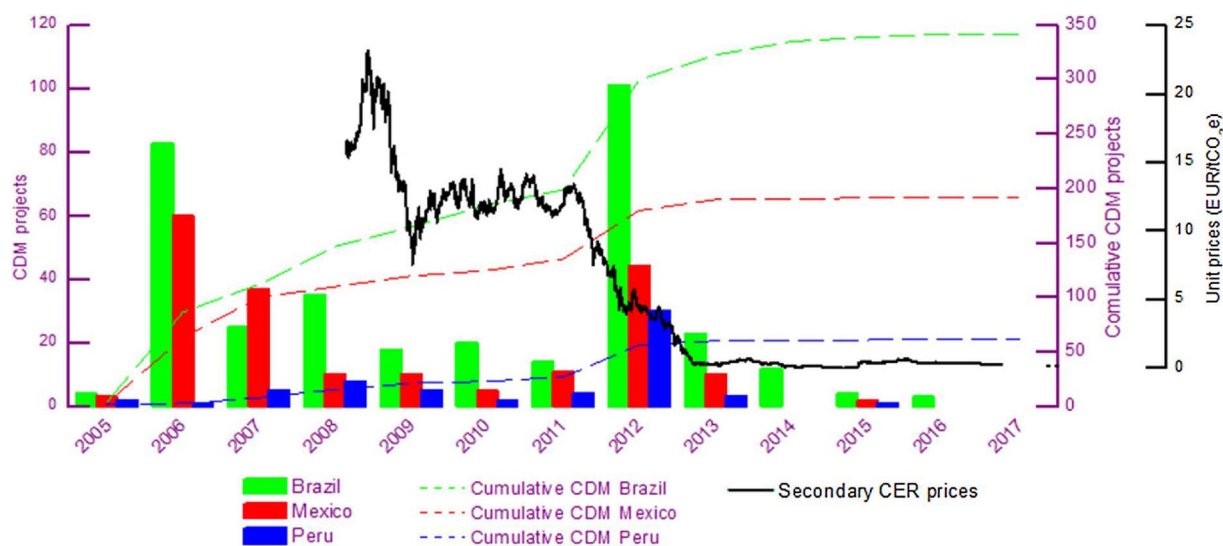


Fig. 2. Registered CDM projects and secondary CERs price.

Source: UNFCCC (2017b) for CDM and ECX CER Emission Futures for CERs data on prices.

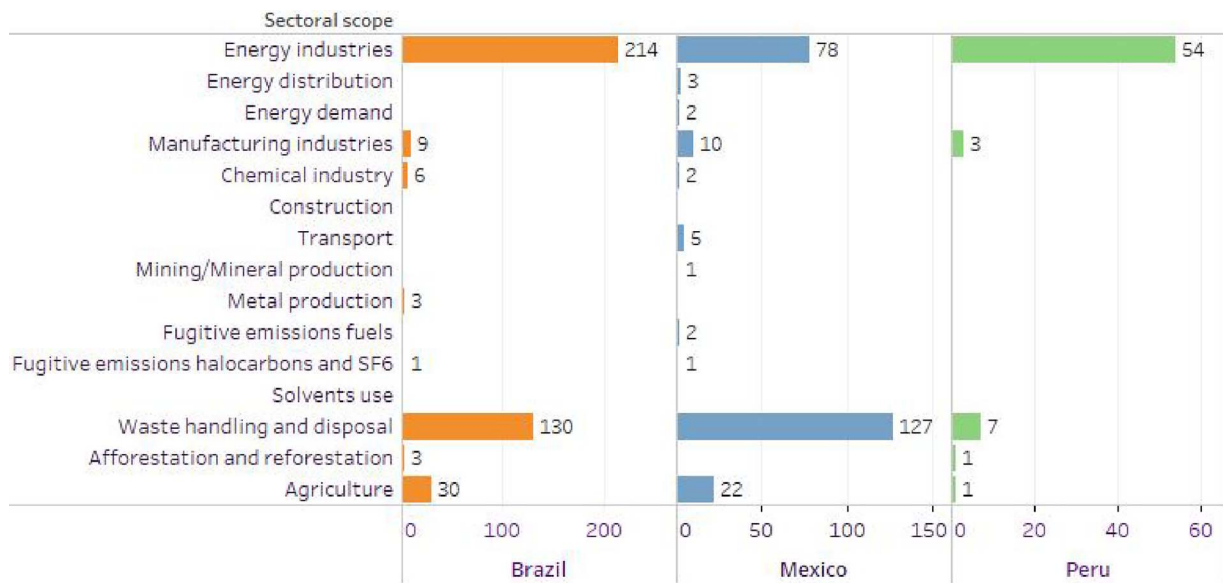


Fig. 3. CDM projects by sector. Note: One project may belong to more than one sector. Source: UNFCCC (2017b).

Table 1
Sample Data Sheet.

	Brazil	Mexico	Peru
Population	41	13	20
Sample size (respondent companies)	26	12	14
Response rate (%)	63,4	92,3	70
Trust rating	90%	90%	90%
Approximate sampling error	10%	10%	10%
Data collection period	November 2012 to March 2013		
Interlocutor preferred	Responsible for project as Annex 1 of the PDD of CDM.		

Table 2
Pearson's chi-squared test.

Pearson's chi-squared test (χ^2)	
Null hypothesis	H_0
Degrees of freedom	8
Level of confidence (p-value)	0.05
Critical value $\chi^2_{critical}$	15.51
$\chi^2_{testvalue} > \chi^2_c$	Rejects H_0
$\chi^2_{testvalue} < \chi^2_c$	Accept H_0

differences among respondents from the three countries, based on the following predefined variables:

Probability settings: $p = 0.05$, degrees of freedom = 8, and $\chi^2_{critical} = 15.51$

Null hypothesis H_0 : There is no difference between the responses of the companies in the three countries; the responses are homogeneous.

If $\chi^2_{calculated} \geq \chi^2_{critical}$, reject H_0 . In this case, there are significant differences, and companies have different opinions.

If $\chi^2_{calculated} < \chi^2_{critical}$, accept H_0 . There are no significant differences, and companies have the same opinions in the three countries.

Finally, we used descriptive statistics to show the percentage or proportion of responses in each category. We used Spearman's correlation to determine whether the answers were related, and we used the nonparametric Kruskal–Wallis test, and paired samples from the Wilcoxon test to determine whether there were differences between

countries. These tests enabled us to interpret the results in a meaningful way. The null hypothesis H_0 ($p\text{-value} > 0.05$) indicates that there are no differences between the responses of the companies in the three countries. The alternative hypothesis H_1 ($p\text{-value} < 0.05$) indicates that there are differences in the responses.

4. Results

Fig. 4 shows the companies' responses regarding their motivations for carrying out CDM activities (Q1–Q5). The Kruskal–Wallis and Paired Samples Wilcoxon test results (see Annex) show a $p\text{-value}$ greater than 0.05 for all the questions, so our null hypothesis cannot be rejected. The variance of the five categories is much the same, indicating that there is no difference in the answers to these questions between the three countries. Thus, there is consensus among the respondents from the three countries concerning the main motivations for developing CDM projects, which are trade from CERs, investment opportunities, and interest in environmental improvement. There is also consensus about the little perception of the companies in relation to the government influence and incentives for private sector involvement in CDM projects.

Fig. 5 shows the responses for Q06–Q11 regarding the contribution to the companies from the stand point of sustainability, due to the development of CDM projects linked to CSR practices. With the exception of Q10, there is a consensus among respondents in the three countries, accepting the null hypothesis according to the chi-squared test (see Table 2). The Kruskal–Wallis and Paired Samples Wilcoxon test show $p\text{-values}$ greater than 0.05 for questions Q06–Q11 (except Q10). For these cases, our null hypothesis cannot be rejected, and the variance of the five categories is the same. There is no difference in the answers to these questions between the three countries. For Q10, the Kruskal–Wallis test gives a highly significant $p\text{-value}$ ($p = 0.0099$), which leads us to accept the alternative hypothesis, that there are differences in responses between countries. The Paired Samples Wilcoxon test finds a significant $p\text{-value}$ ($p = 0.066$) between responses from Brazil and Mexico for Q10. Thus, we accept H_1 , which means that there are differences in responses between the two countries.

Fig. 6 shows the companies' responses in the three countries about the positive contribution to the companies' leadership, image, or position resulting from the CDM activities. For instance, Q14 (“strengthened the image”) shows higher percentages for the three countries, with

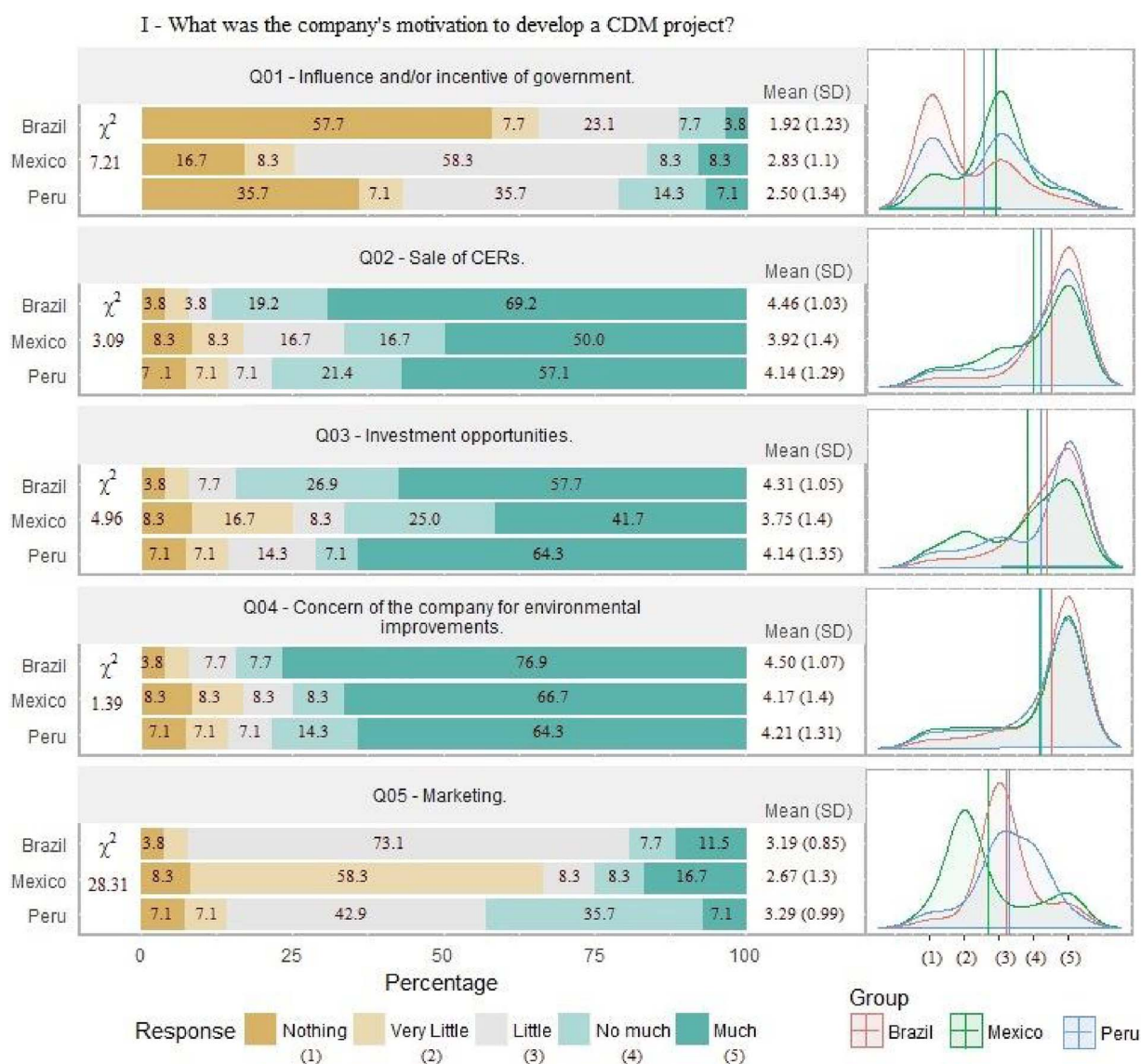


Fig. 4. Companies' motivation for carrying out CDM activities.

a chi-squared value of 0.84, representing a consensus among the respondents. The Kruskal–Wallis and Paired Samples Wilcoxon test show *p*-values greater than 0.05 for Q12–Q15. For these cases, our null hypothesis cannot be rejected, showing equal variance among the five categories. There is no difference in the answers to these questions between the three countries.

In general, the positive responses to this section can be explained by the fact that CDM is considered a new market, and companies that have undertaken these projects have contributed to the implementation of a new operating model within the sector and country in which they operate. Companies that have developed such projects have been the subject of case studies, reports in the media, and presentations at academic seminars and conferences. Their GHG reduction actions and their social activities are disclosed in their respective sustainability reports. In addition, they serve as reference points for similar projects being developed in the country and other companies carrying out such activities.

5. Discussion

Regarding the motivation for carrying out CDM activities (Fig. 4), the most representative responses were the interest of the company in

improving the environment, trade in CERs, and investment opportunities. From a corporate perspective, the CDM is seen as a good system to promote technological improvements and help build skills that can be used in other areas, such as showcasing a company's environmental management strategy. For this reason, some respondents recognized that their CDM projects were initially motivated by their interest in improving the environment.

However, the demand for the CDM credits and the CERs price collapsed, and the number of projects registered has decreased since 2013 (as shown in Fig. 2). This decline can be attributed to the lack of ambition to mitigate pre-2020; with no increase in countries' ambitions under the UNFCCC, the demand for CERs remains low. The parties participating in the second commitment period of the Kyoto Protocol represent only 12% of global emissions. The Doha Amendment, which contains the emissions reduction targets put forth by the parties for the second commitment period, is not yet in full force (Ecofys, World Bank, 2014). With the Paris Agreement, market mechanisms are finding new sources of demand, but the outlook remains uncertain (Zechter et al., 2017).

The results of this study show that businesses' efforts to reduce GHG emissions are driven primarily by the market opportunities created by CDM. An earlier study on CDM in Latin America shows similar finding

II - What was the contribution to your company in terms of sustainability for developing the CDM project?

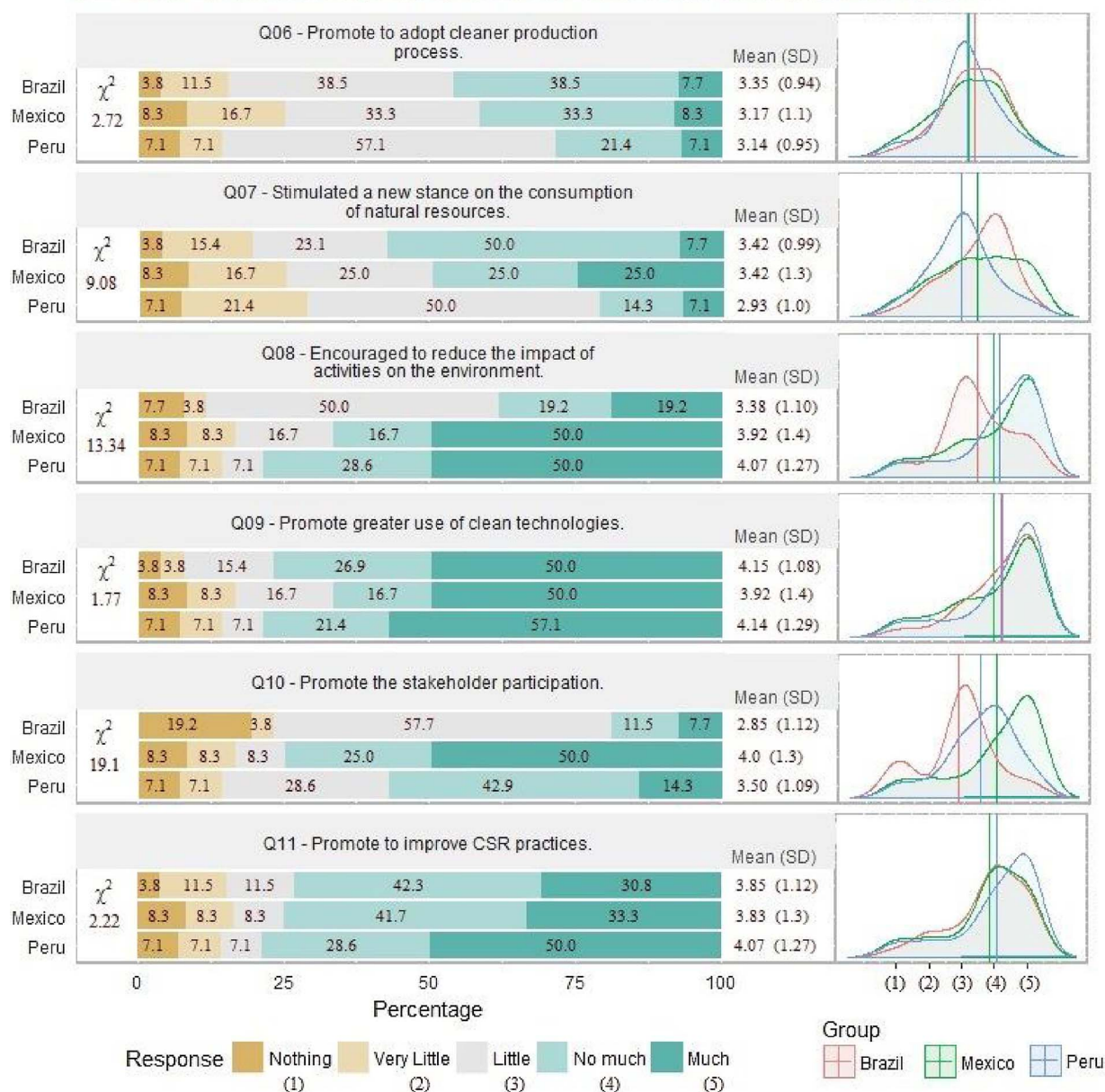


Fig. 5. Contribution to the companies in terms of sustainability for developing CDM projects.

that the main factors influencing whether companies' plan to invest in CDM projects are the uncertainties in negotiations under the UNFCCC and the low prices of CERs (Lazaro and Gremaud, 2017). Carbon pricing plays an important role in the business response to tackling climate change, because it requires the cost of GHG emissions to be considered in financial decisions (Zechter et al., 2017).

The results of Figs. 5 and 6 show that the contribution to these companies in terms of sustainability, reputation and position as a result of CDM projects are positive. From a business perspective, companies that have embraced CSR showcase their ecological responsibility by carrying out CDM projects that simultaneously reduce GHG emissions and promote sustainable development. There are several studies on corporate motivations for ecological responsiveness in developed countries. On such study was undertaken by Bansal and Roth (2000), who identified three corporate motivations to go green: competitiveness (the potential to improve long-term profitability); legitimation (the desire of a firm to improve the appropriateness of its actions within an established set of regulations, norms, values, or beliefs); and ecological

responsibility (a motivation that stems from the concern that a firm has for its social obligations and values).

In Latin America, on the contrary, studies such as Bebbington et al. (2017), Benites-Lazaro and Mello-Théry (2017) and Pozas et al. (2015) show that business concern would be more related to legitimation. This is the reason that economic development in general in this region is based on natural resource extraction. The "extractive imperative" (Arsel et al., 2016) is seen as a source of income, employment generation, and financing for increased social policy expenditure. Accordingly, resource extraction needs to continue to expand independently of prevailing negative socio-environmental impact. For this reason, companies extracting resources have faced significant criticism and are seen as a threat to traditional ways of life. These criticism have driven businesses to further define CSR in more detailed ways to win the hearts of the people, and obtain social legitimacy for their activities (Benites-Lazaro et al., 2017; Benites-Lazaro and Mello-Théry, 2017; Klein, 2013).

The project developers of the analyzed CDM projects in this study described some CSR activities in their PDD. For example, in Brazil, the

III – Has there been an improvement in the value, position or image of the company due to the participation in the CDM project?

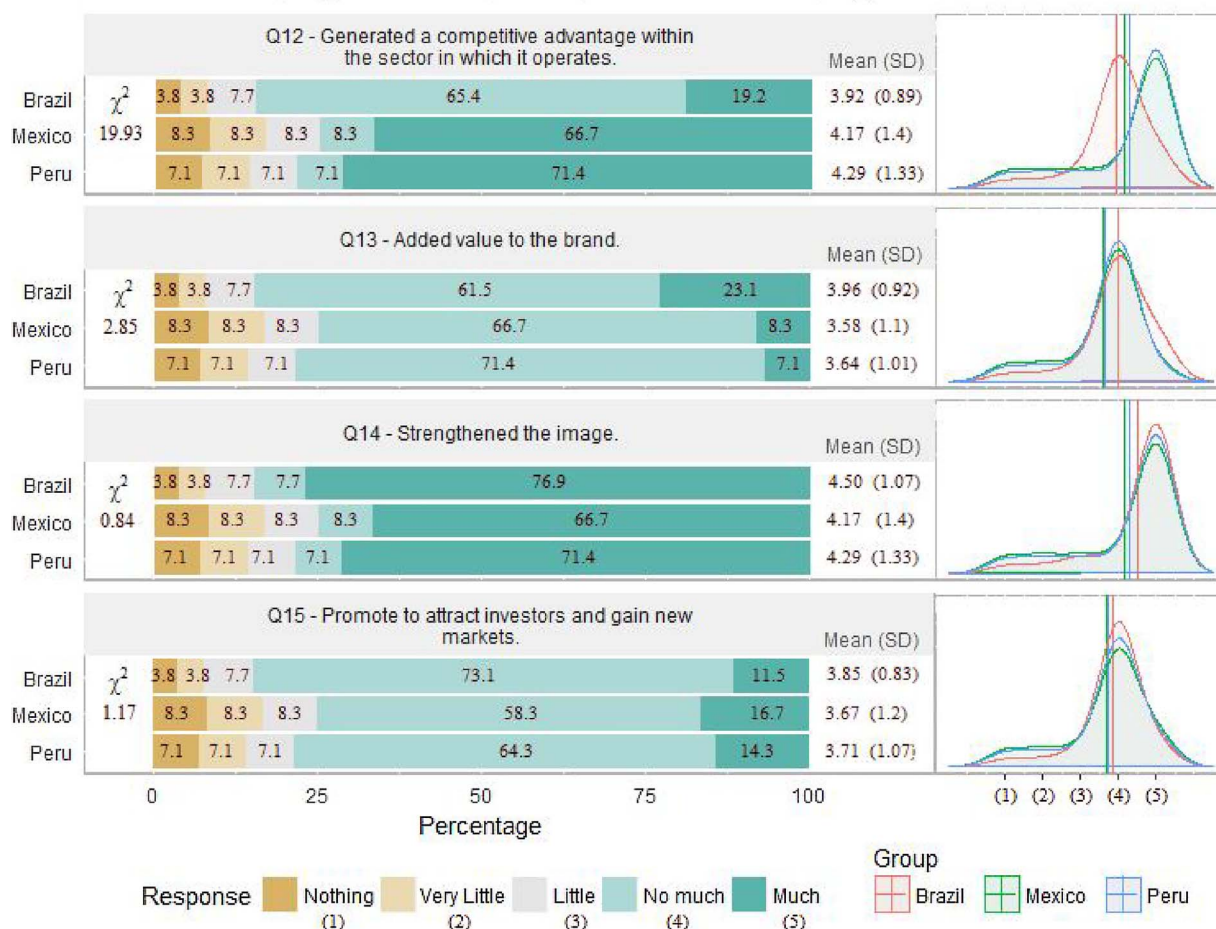


Fig. 6. Improvement in the position of the company as a result of participation in the CDM project.

Votorantim company reports that revenues obtained from the sale of the CERs of its CDM will help it develop CSR activities, such as reforestation of mining areas; recycling; industrial water management; environmental education activities; water, soil, and air monitoring and liquid, solid, and gaseous effluent treatment that will improve the environmental quality of the region where the project is located (UNFCCC, 2017b – PDD 3921).

In Mexico, the CDM project activity developed by PEMEX – Petroleos Mexicanos is claimed to have yielded Maya crude oil production with lower related CO₂ emissions by eliminating the consumption of natural gas for this purpose, allowing recovery and utilization of a waste resource for the purpose of thermal generation, and the creation of job opportunities as part of the construction phase, operation, and maintenance of the WHRS in the process (UNFCCC, 2017b – PDD 4966). In Peru, the Huanza hydroelectric project developed by Generación Huanza company, which is a subsidiary of the Buenaventura mine, has, according to PDD, implemented several CSR activities which have targeted the Huanza community, such as training/education, job-creation programs, and initiatives aimed at improving the infrastructure of the education and health center of the community by means of new equipment and materials (UNFCCC, 2017b – PDD 4306).

These actions reinforce responses presented in Figs. 5 and 6 and both the CDM and CSR activities carried out around the projects have contributed to companies' showcasing of their environmentalism. For example, Samarco's sustainability report shows that its CDM project reduced by 207,000 tons of CO₂ equivalent in 2011, thus contributing

to GHG reduction. Another example is that of the Buenaventura company, which notes in the sustainability section of its website that the power generation of the Huanza hydroelectric plant will be used for mines and companies belonging to the group to ensure a reliable supply of energy derived from a clean and renewable source for direct operations and projects at competitive prices.

However, both CSR and CDM have received heavy criticism. Critics argue that CSR is often little more than a cover for superficial ecological responsibility or competitiveness-driven changes in business practices, rather than a more fundamental transformation (North, 2016). The CDM has been accused of being an inappropriate mitigation strategy for climate change because it is an inexpensive route for rich countries to take action, encouraging a focus on cost-effective emissions reduction by offsetting production at the expense of sustainable development (Carton, 2014; Okereke, 2010).

In Latin America, CSR initiatives are subject to public skepticism, mainly as a result of "corporate social irresponsibility" (Fiaschi et al., 2017), a label for situations in which companies are involved in environmental disasters and human rights abuses. For example, the worst environmental disaster in Brazil's history was caused by the mining company Samarco in 2015, confirming the public's disbelief of CSR and revealing that current CSR standards are not sufficient to protect society and the environment. Samarco has been recognized in the last 20 years as one of the leaders in socio-environmental responsibility in Brazil, earning awards and being the first mining company in the world to comply with the ISO 14001 standard (Almeida, 2016). However, these awards, and the performance they were based upon, did little to prevent

one of the country's major environmental and social tragedies, which exposed a series of failures in planning, control, and risk management (Phillips, 2016).

This study reveals contradictions in what companies say and the results of their actions for society and the environment; the CDM underscores this contradiction. On the one hand, these projects are presented as a solution to the problem of climate change (Altvater and Brunnengräber, 2011). On the other hand, there are perceived negative effects on communities. In Latin America, several CDM projects have been criticized; for example, hydroelectric projects are presented as being a source of renewable energy, when they have had numerous negative impacts on communities (Ranängen and Zobel, 2014).

In particular, hydroelectric projects in the Amazon rainforest have been denounced for their devastating environmental and social impacts and for emitting higher levels of GHGs than are recognized in the CDM procedures (Fearnside, 2015). Critics wonder how a company such as Teles Pires Hydroelectric Company, which won a Green Certificate in "Responsible Environmental and Social Management" when its dam project destroyed indigenous and traditional communities, forced the relocation of the local population, led to the dynamiting of an indigenous sacred site, harmed biodiversity and fisheries, and generated significant carbon emissions, could possibly get its CDM project approved and registered (Branford and Torres, 2017; Fearnside, 2015). Similar contradictions and conflicts with local communities occur in other Latin American countries, as in the case of several hydroelectric projects in Peru (UNFCCC, 2017b – PDD 2426) and several wind energy projects in Mexico (Juárez-Hernández and León, 2014).

These examples illustrate how the CDM incentive structure, while fostering environmentally sustainable outcomes by reducing levels of GHG emissions, may inadvertently lead to socially suboptimal outcomes for local communities by failing to mandate ethical compliance standards for companies involved in CDM projects (Martinez and Bowen, 2013). What the experience of the CDM projects shows in the absence of requirements to monitor is whether the expected benefits of sustainable development or CSR activities declared by project proponents are actually achieved (Benites-Lazaro et al., 2017; Benites-Lazaro and Mello-Théry, 2017). To implement the new mechanisms enshrined in Article 6 of the Paris Agreement, it has been recommended that institutions be strengthened and enhanced (Olsen et al., 2017), providing efficient and environmentally robust climate markets by ensuring strong price incentives to encourage business participation (Zechter et al., 2017).

6. Conclusion

Although current carbon market conditions and climate policies are not very effective in facilitating the reduction of GHG emissions, this study provides evidence that economic incentives have a positive effect on business efforts to reduce emissions. The results of this study show that companies are motivated to undertake CDM projects by revenue from investment in CERs and because of their interest in improving the environment. This shows that the dominant discourse concerning the opportunities that climate change offers to businesses as a protection for their social capital, for profit from carbon offset trading, clean technology investments, and a CSR tool.

The development of CDM projects and CSR in Latin America has important implications and lessons for both governments and businesses. Governments should provide initiatives that encourage the development of projects that are sustainable and implement decisive measures to disseminate mitigation practices. As shown in Fig. 1, the perception of the responding companies concerning government incentives to carry out CDM projects was small (around 8% for Brazil and Mexico, and 14% for Peru), revealing that it is not clear whether the government's regulations and incentives provide sufficient motivations for businesses to participate in the implementation of the CDM. Further in-depth research should be undertaken which explore the role of the

government in the development of private sector financed CDM projects. Businesses must understand the risks associated with, and opportunities created by, climate change. The risks can affect organizations, damage public reputations, and result in fines or litigation. The opportunities include additional profits generated by sustainable projects and the showcasing of companies' commitment to environmental protection.

Related to CSR, this study reveals contradictions in what some companies say and the results of their actions for society and the environment. There are numerous examples in Latin America of scandals involving companies that have contaminated the environment or violated human rights, which indicates that CSR and the concern over climate change in the region are still emerging. There is still a lack of research on how businesses in Latin America respond to climate change.

The CDM and the Paris Agreement aim to facilitate cost-effective emission reduction and sustainable development benefits. However, the incentive structure for CDM demonstrates that it only values the emission-reduction component of a proposed CDM project. Thus, such projects must be valued more, specifically, interventions associated with greater social and environmental benefits. The challenge under the Paris Agreement is how to provide competitive and environmentally robust climate markets, and to encourage business participation in climate change mitigation activities.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.exis.2018.02.011>.

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